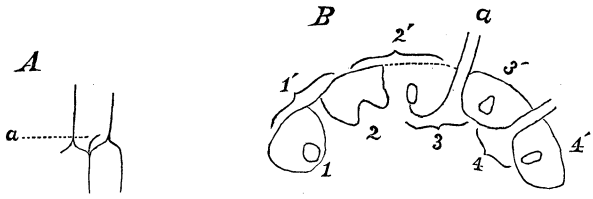
0.39; FeO = 8.33; MnO = 12.13; total 99.86. Sp. gr. = 7.72. ——Hidden[1] mentions a new locality in Colorado for phenacite, xenotime and fayalite, also another for rutile, emerald and hiddenite (spodumene). A crystal of zircon from Burgess, Canada, gave the same author a new plane ⅓P not hitherto observed in this mineral.

BOTANY.[2]

THE NODE OF EQUISETUM.—If a section is made lengthwise through a node of a fertile stem of *Equisetum arvense*, each vascular bundle is seen to divide into two parts, each part uniting with a corresponding part of an adjacent bundle to form one of the bundles of the next internode (Fig. *A*.). If the section be



A. Showing the branching of the bundles at the node, seen longitudinally. *B*, a horizontal section of a portion of the bundle ring in a node.

made radially through one of the teeth of the sheath or rudimentary leaves, a bundle is seen to pass down and unite in the node with one of the bundles of the stem. Fig. *B*, a horizontal section in the node of a portion of the bundle ring, shows how this leaf bundle originates. It is seen that the bundle of the leaf is derived, not by a simple separation of a portion of the outer phlœm, part of the bundle in the stem, but that it originates where that bundle begins to divide, and in such a manner that its vessels are continuous with the xylem of the divided bundle.

Each bundle of the stem therefore divides at the node in three parts—two lateral portions, each with xylem and phlœm, which by rearrangement continue the bundles of the stem, and a central part which bends outward into the leaf.

In Fig. *B*. bundle 3 has divided, and given origin to the leaf bundle *a*, and two lateral portions, one of which has united with half of the divided bundle 4 to form the perfect bundle 3′, the other half being ready to unite with half of the dividing bundle 2 to form a bundle at 2′. A section a very little farther up would show bundle 2′ completed and bundle 2 in the condition that 3 now is. As the leaves do not arise quite on the same horizontal plane successive sections show the process repeated both to the

[1] American Journal of Science, March, 1885, p. 249.

[2] Edited by Professor CHARLES E. BESSEY, Lincoln, Nebraska.

right and left until the opposite side of the stem is reached, and as many leaves have been produced as they are bundles in the stem.—*A. A. Crozier, Botanical Laboratory, University of Michigan.*

DISPERSION OF SPORES IN A TOADSTOOL.—A few days since I collected specimens of *Agaricus illudens* for use in my class in botany. I placed the fungi on my table to remain over night that I might in the morning be able to show the color of the spores. What was my surprise on examining my specimens in the morning to find spores in great abundance, not immediately beneath the pileus, but shot out in every direction to the distance of from six to twelve inches, and I know not how much further, as the greater distance named reached the edge of my table. In one direction a roll of paper interrupted the flight of the spores, and from the surface of the paper the little bodies were reflected back in the direction of their origin, and falling finally upon the table formed quite a little drift of accumulated spores, thus showing that the projectile force in operation was strong enough to cause at a considerable distance a very decided rebound.

Such means for the disposal of the spores I have never before observed either in connection with this or any other agaric, nor have I seen notice of such a phenomenon. The atmosphere of my room was at the time very dry, and this fact undoubtedly had something to do with the remarkable distribution described.—*—T. H. McBride, Iowa City, Oct., 1884.*

THE FERTILIZATION OF CUPHEA VISCOSISSIMA.—The entire plant is clammy pubescent, especially the stems and calyces. There are six petals, purple, the two upper ones about twice the size of the rest, the four lower ones being placed along the lower edge of the calyx (Fig. 1 *A*). The lower part of the calyx near the throat is inflated, and the base is spurred (Fig. 1 *B*). On the

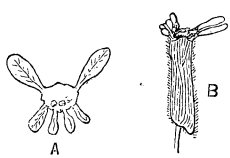


Fig. 1.

Fig. 2.

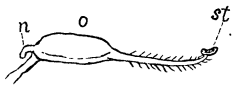


Fig. 3.

Cuphea viscosissima. × 1¾.

FIG. 1.—*A.* View of corolla from above. *B.* Side view of flower. FIG. 2. Corolla split open to show the relative position of stamens, magnified. FIG. 3. The pistil. *n*, nectary, *st*, stigma, *o*, ovary.

lower part of the calyx near the inflated portion are inserted the stamens at different heights, generally eleven, the two outer ones being decidedly lower than the rest, while the nine are arranged in two sets, one shorter than the other (Fig. 2). The ovary has a projection towards the base which enters the nectary of the

calyx, and supplies the honey; the stigma is two-lobed, the lower lobe being decidedly smaller (Fig. 3). There is a decided variation in the length of the style, but I was unable to deduce any dimorphic arrangement from what I saw. Long-tongued bees visit the flower, and the case seems one of synacmy, the outer stamens, however, maturing first, and the next in order.—*Aug. F. Foerste, Granville, Ohio.*

THE INTERNAL CAMBIUM RING IN GELSEMIUM SEMPERVIRENS.—Dr. J. T. Rothrock, at the meeting of the Botanical Section of the Academy of Natural Sciences of Philadelphia, held February 9, 1885, called attention to the internal cambium ring in the stem of *Gelsemium sempervirens.* It might well be designated as the inner cambium. His attention was attracted by the fact that in a *stem* of three-eighths of an inch diameter, the pith was actually less in diameter than in a *twig* of a quarter the size of the *stem.* Microscopic examination showed that in the larger stem there were ordinarily four or more points, at which a well-defined swelling curved inward from the circumference of what should have been the pith-cavity. These swellings resolved themselves when closely examined into:

1. Toward the center an imperfectly defined membrane, resembling cuticle, which was not always present.
2. One or more rows of large cells like the parenchyma we find under the epidermal layer.
3. Several poorly defined layers of smaller cells, such as often mark the limits of growth in bark.
4. The frequent presence of bast fibers or of sclerenchyma cells.
5. An evident layer of thin-walled, square cells, closely resembling, though somewhat smaller than those of the external cambium. They showed signs of division, which indicated that they were still a living tissue.

These facts explained at once why the pith was constantly being encroached upon until it at length almost disappeared. The medullary rays dipped down through, and widened out, in this inner cambium, *inwardly*, just as they did *outwardly*, in the usual form of cambium layer. He also remarked that bast fibers had long been known to exist in the pith of *Tecoma radicans*, and in this case something like an inner cambium would be found, though it is more obscure. *Sambucus canadensis* also exhibited in the very large stems a smaller pith than in those of moderate size. In this there was nothing comparable to the inner cambium. He also remarked that for the past two winters his attention had been called to the presence of considerable quantities of chlorophyll in the pith of *Lycium vulgare.* This was not confined to the smallest stems, but was found also in those of over a quarter of an inch in diameter, and where of course a considerable belt of

hard wood was found between the pith and the outer zone where chlorophyll is expected. It was also observed in Lycium that the chlorophyll was not in the form of bodies, but diffused in character, as it is said to be in some infusorians. In Lycium the cells of the pith showed, in winter, abundance of protoplasm which had the nucleus on one side and very striking bands extending thence across the cell to the further side.—*Proc. A. N. S. Phila.*

STRASBURGER'S BOTANISCHE PRACTICUM.—About a year ago this book appeared in Germany, where it has received many favorable notices, as an excellent work for the laboratory student. The book is so valuable that it must soon be translated, but in the meantime we may well give an outline of what it contains. After an introductory chapter devoted to the microscope, various kinds of apparatus, reagents, staining fluids, etc., etc., the work is divided into thirty-four "tasks," in which particular subjects are taken up. The aim of the author is to train the student at once in microscopy and botany, rightly believing that the art named can be best learned in its application to the science of plants. As far as possible the plants selected are common and easily obtainable ones. The illustrations, of which there are 182, are all new, and are made especially for this work.

The general sequence of subjects is as follows: Starch, aleurone, protoplasm, chlorophyll and other coloring matters; crystals; anatomy of the root of sugar-beet; fruit of pear; epidermis and stomata of Iris, Tradescantia and other plants; hairs of various plants; fibro-vascular bundles of Indian corn, oats, palm, Ranunculus, Aristolochia, etc., etc.; secondary wood, anatomy of stems of Scotch pine, linden, ivy, locust (Robinia), pumpkin, etc., etc., running through twenty "tasks" or chapters. A couple of chapters are devoted to the structure and reproduction of mosses, five to the fungi and algæ, one to the reproduction of pteridophytes, another to that of conifers, and five to that of phanerogams proper.

A smaller edition has appeared in Europe, but this we have not yet seen. We trust that a translation of either the larger or the smaller work will be placed before the English-speaking students of this country. There is certainly room for such a book here.—*Charles E. Bessey.*

THE PAMPAS.—In answer to the statement of Professor Asa Gray, following Darwin and Ball, that the pampas of South America are treeless because the only country from which trees could be derived could not supply species suitable to the soil and climate, Mr. Edwin Clark puts forward, in a letter to *Nature*, what he, from long residence and observation, believes to be a more probable cause or series of causes. From the absence of rivers or water storage, periodical droughts (siccos) occur in the

summer, and at such seasons the droves of horses and cattle and the numerous aboriginal wild rodents destroy every vestige of vegetation in their efforts to live, the cattle even tearing out the roots of the pampas grass. The existence of an unprotected tree is impossible. Nothing survives save thistles, some grasses and clovers, a few poisonous plants, thorny dwarf acacias and wiry rushes. The extensive introduction of European plants has only added to the flora of the pampas a few species, such as two thistles that are unassailable by cattle. Yet the soil is fertile and trees grow luxuriantly wherever they are protected.

BOTANICAL NOTES.—The odd tree known to the Mexicans by the name of Ocotilla, and to botanists as *Fouquieria splendens*, a native of the Rio Grande plateau region, has been made the subject of chemical studies by Miss Helen C. De S. Abbot, of the Philadelphia College of Pharmacy, the results of which have lately been published in an eight page pamphlet. A new vegetable wax was discovered in the bark, to which the name of Ocotilla wax was given.——Dr. Farlow's paper on the Synchitria of the United States, in the March *Botanical Gazette* is of unusual interest. It contains descriptions of all the species known to exist in the United States, ten in all.——The Botanic garden of Buitenzorg, Java, founded in 1817, consists of ninety-one and a half acres, and contains more than nine thousand species of plants, each represented by two specimens. Connected with the garden is a botanical museum, containing the herbarium, a collection of vegetable products, and the library, with facilities for drawing and photography. All this is in far-off Java! When may we hope for that kind and amount of state help in this country which will enable our botanists to begin the making of botanic gardens worthy of the name?——As showing the tendency in our best universities we note that, according to an item in the *Gardeners' Monthly*, the University of Michigan "has established a chair of forestry in connection with its other branches of education."—— The University of Nebraska has made an appropriation of five thousand dollars for procuring apparatus and collections for its department of botany.

ENTOMOLOGY.

REPRODUCTION IN THE HONEY-BEE.—At a late meeting of the Royal Microscopical Society, Mr. Cheshire exhibited and explained four preparations—three of spermatozoa and one of the muscles of the valve of the receptaculum seminis of the queen bee, which he had recently succeeded in dissecting, and of which he gave an interpretation at a previous meeting. The muscles were shown under polarized light with the prisms crossed, so that two sphincters which overlap, and the fibers of which cross, can be dissected. One resolves the polarized beam completely, while